

C4. Missing sides

Do now: solve the equations

$$(i) \frac{x}{3} = 5$$

$$(ii) \frac{3}{x} = 5$$

$$(iii) \frac{3}{x} = -5$$

Worked Example

Your Turn

$$\sin(30) = \frac{x}{5}$$

$$\cos(45) = \frac{x}{4}$$

Find 'x'. Give your solution to 2 decimal places.

1. $\tan(30) = \frac{x}{2}$ $x = 1.15$

2. $\tan(45) = \frac{x}{2}$ $x = 2$

3. $\sin(45) = \frac{x}{2}$ $x = 1.41$

4. $\sin(45) = \frac{x}{4}$ $x = 2.82$

5. $\frac{x}{4} = \sin(45)$ $x = 2.82$

6. $x \times \sin(45) = 4$ $x = 5.65$

7. $x \times \sin(30) = 4$ $x = 8$

8. $x \times \cos(30) = 4$ $x = 4.61$

9. $x \times \cos(30) = 8$ $x = 9.24$

10. $x \times \cos(31) = 8$ $x = 9.33$

Worked Example

Your Turn

$$\sin(15) = \frac{5}{x}$$

$$\cos(45) = \frac{5}{x}$$

Find 'x'. Give your solution to 2 decimal places.

1. $\cos(30) = \frac{2}{x}$ $x = 2.31$

2. $\cos(45) = \frac{2}{x}$ $x = 2.83$

3. $\sin(45) = \frac{2}{x}$ $x = 2.83$

4. $\sin(45) = \frac{4}{x}$ $x = 5.66$

5. $\sin(45) = \frac{8}{x}$ $x = 11.31$

6. $\tan(45) = \frac{8}{x}$ $x = 8$

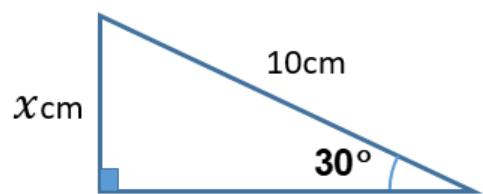
7. $\tan(45) = \frac{x}{8}$ $x = 8$

8. $\cos(45) = \frac{x}{8}$ $x = 5.66$

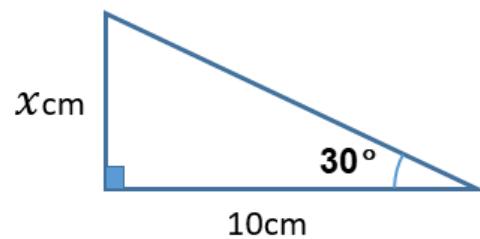
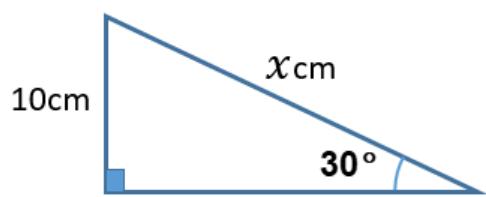
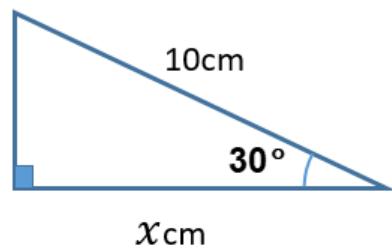
9. $\cos(45) = \frac{8}{x}$ $x = 11.31$

10. $\frac{8}{x} = \cos(45)$ $x = 11.31$

Worked Example

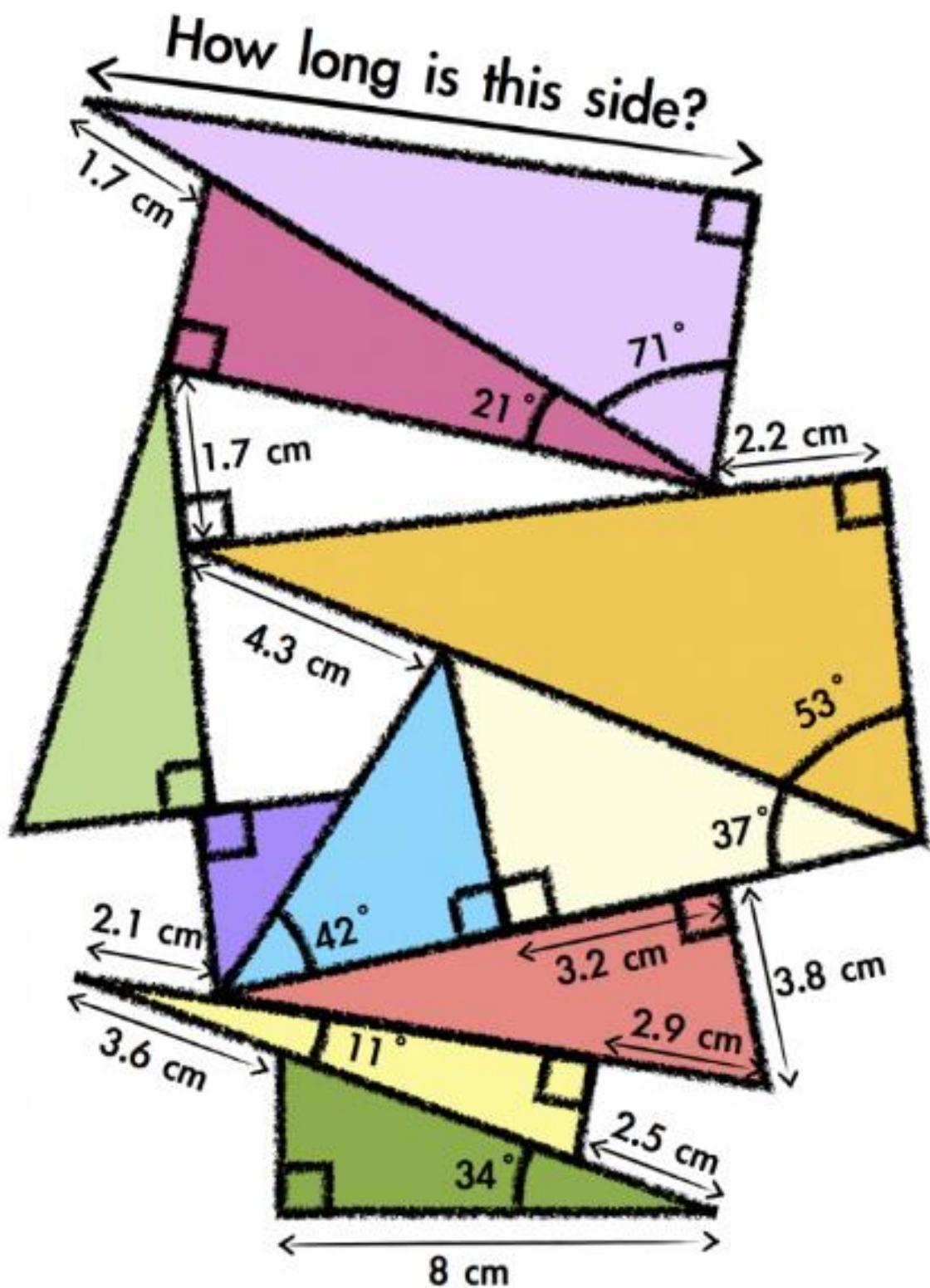


Your Turn



Labelled diagram	Choose ratio	Substitute into formula	Rearrange formula	Answer (1dp)
	sin	$\sin 38 = \frac{x}{11}$	$x = 11 \times \sin 38$	6.8 cm
	tan	$\tan 51 = \frac{x}{6}$	$x = 6 \times \tan 51$	7.4 cm
	cos	$\cos 63 = \frac{x}{37}$	$x = 37 \times \cos 63$	16.8 mm
	cos	$\cos 28 = \frac{8}{x}$	$x = \frac{8}{\cos 28}$	9.1 cm
	tan	$\tan 71 = \frac{2.5}{x}$	$x = \frac{2.5}{\tan 71}$	0.86 m
	sin	$\sin 49 = \frac{13}{x}$	$x = \frac{13}{\sin 49}$	17.2 cm
	cos	$\cos 35 = \frac{x}{5.7}$	$x = 5.7 \times \cos 35$	4.7 cm
	tan	$\tan 68 = \frac{7}{x}$	$x = \frac{7}{\tan 68}$	2.8 cm

Trigonometry Pile Up!



Use this page for workings

$$\cos 34^\circ = \frac{8}{a}; \cos 34^\circ \approx 0.829$$

$$\frac{8}{a} = 0.829 \rightarrow a \approx 9.65$$

$$9.65 - 2.5 + 3.6 = 10.75$$

$$\cos 11^\circ = \frac{b}{10.75}; \cos 11^\circ \approx 0.981$$

$$\frac{b}{10.75} = 0.981 \rightarrow b \approx 10.55$$

$$10.55 - 2.1 + 2.9 = 11.35$$

$$c^2 + 3.8^2 = 11.35^2$$

$$c^2 = 11.35^2 - 3.8^2$$

$$c \approx 10.69$$

$$10.69 - 3.2 = 7.49$$

$$\tan 42^\circ = \frac{d}{7.49}; \tan 42^\circ \approx 0.9$$

$$\frac{d}{7.49} = 0.9 \rightarrow d \approx 6.74$$

$$\sin 37^\circ = \frac{6.74}{e}; \sin 37^\circ \approx 0.602$$

$$\frac{6.74}{e} = 0.602 \rightarrow e \approx 11.2$$

$$11.2 + 4.3 = 15.5$$

$$\sin 53^\circ = \frac{f}{15.5}; \sin 53^\circ \approx 0.8$$

$$\frac{f}{15.5} = 0.8 \rightarrow f \approx 12.4$$

$$12.4 - 2.2 = 10.2$$

$$g^2 = 10.2^2 + 1.7^2 \rightarrow g \approx 10.34$$

$$\cos 21^\circ = \frac{10.34}{h}; \cos 21^\circ \approx 0.934$$

$$\frac{10.34}{h} = 0.934 \rightarrow h = 11.07$$

$$11.07 + 1.7 = 12.77$$

$$\sin 71^\circ = \frac{x}{12.77}; \sin 71^\circ \approx 0.946$$

$$\frac{x}{12.77} = 0.946 \rightarrow x \approx 12.1 \text{ (cm)} \leftarrow \text{Answer}$$